IN THE UNITED STATES DISTRICT COURT
FOR THE MIDDLE DISTRICT OF NORTH CAROLINA

FUMA INTERNATIONAL., LLC,	)	
	)	
Plaintiff,	)	
	)	
v.	)	1:19-CV-260
	)	1:19-CV-660
R.J. REYNOLDS VAPOR COMPANY,	)	
	)	
	)	
Defendant.	)	

MEMORANDUM OPINION AND ORDER

Catherine C. Eagles, District Judge.

In this consolidated action, the plaintiff, Fuma International, LLC, claims that two electronic cigarettes designed and sold by the defendant, R.J. Reynolds Vapor Company, the VUSE Solo and the VUSE Ciro, infringe its patents. The parties have filed cross-motions for summary judgment.

Fuma is entitled to summary judgment on the issue of direct infringement of the '881 patent by the Solo and the Ciro. Fuma is also entitled to summary judgment of direct infringement of the '604 patent by the Ciro and as to all of the elements but one by the Solo. Disputed questions of fact remain as to whether the Solo has an "electrically conductive threaded portion" and thus infringes the '604 patent.

I. Statement of the Case

In dispute are two patents issued to Fuma: U.S. Patent Nos. 9,532,604 ('604 patent), *see* Doc. 76-2, and 10,334,881 ('881 patent). *See* Doc. 76-3. The patents-in-suit each describe an electronic cigarette comprised of a cartridge and a power source that are

substantially the same in specification. Fuma accuses two of RJR's products, the VUSE Solo[1] and the VUSE Ciro, of literally infringing claims 1 and 8 of the '881 patent and claims 4, 6, 12, 14, 16, and 18 of the '604 patent. Doc. 122 at 9. Both patents apply to each accused product. The Court has previously construed various disputed terms in each of the patents. Doc. 95. Fuma has moved for summary judgment of patent infringement, Doc. 119, and RJR has moved for summary judgment of noninfringement. Doc. 121.

The parties agree that the Solo and the Ciro meet the elements of the patents, with only three exceptions:[2] (1) whether the Solo's coupling features infringe an element of the '881 patent; (2) whether the direction of the Ciro's airflow passageway infringes an element of the '881 and '604 patents; and (3) whether the Solo contains an "electrically conductive threaded portion" that infringes the '604 patent. Fuma and RJR both move for summary judgment as to the first two exceptions, while RJR alone moves for summary judgment of noninfringement as to the third.[3]

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[1] There are two versions of the Solo: the "Gen 1" and "Gen 2." Fuma alleges that both versions are in violation of the patents-in-suit. The parties agree that the differences between the versions are immaterial for the purposes of this motion. *See* Doc. 120 at 4; Doc. 120-1 at ¶ 27 ("For purposes of my report, the SOLO Gen 1 and Gen 2 are materially the same . . . ."). The Court will refer to the "Solo" for ease of reading.

[2] Fuma attributed a fourth exception to RJR involving the required length of the "solution holding medium" of the accused products under both patents-in-suit. *See* Doc. 120 at 8–12. In response, RJR clarified that it did not intend to raise the attributed argument and conceded the point to Fuma. Doc. 131 at 6 n.1; *see also* Doc. 133 at 3.

[3] Beyond the issues mentioned in this Order, neither party has raised any other area of dispute. Fuma's motion for summary judgment of infringement asserted that the accused products meet every claim element in the patents-at-issue but only addressed the only elements it believed to be in dispute. *See* Doc. 120 at 5–6 (showing charts of remaining claim elements believed to still be in dispute by Fuma). RJR filed a cross-motion for summary judgment of

II. The Accused Products

A. VUSE Solo

The Solo is an electronic cigarette consisting of two pieces: a power unit and a cartridge. The power unit includes a battery and a connecter piece, which connects to the cartridge base to create a single instrument. Doc. 122-8 at ¶¶ 26, 36–37. The cartridge base houses three electrical contacts. *See* Doc. 122-1 at 34–35 (describing a "Terminal Center Contact" and two additional "in-molded electrical terminals"). The three cartridge contacts electrically couple with three corresponding electrical contacts in the power unit. *See id*. (explaining how each electrical contact matches the "corresponding terminal[s] on the power unit"). Electrical coupling allows the battery in the power unit to power the cartridge's electrical features. *See id*.

The three electrical contacts do not mechanically couple the cartridge base to the power unit connector. Instead, the cartridge base mechanically couples with the power unit through a series of rings with protrusions and recesses that "snap" into each other when pressed together. *See* Doc. 122-8 at ¶¶ 36–37, 39.

The power unit connector also has "four trapezoidal features" that press into corresponding trapezoidal features on the cartridge base. *Id*. at ¶ 39; *see* Doc. 122-1 at 19, 33 (describing the trapezoidal features in the power unit connector and the cartridge

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noninfringement as to the same claim elements briefed by Fuma in its summary judgment brief, *see* Doc. 122 at 24-25, along with the additional contention that the Solo does not infringe the '604 claim element that requires an "electrically conductive threaded portion." *id*. at 24, and Fuma raised no new issues in response. *See* Doc. 130 at 15; Minute Entry 4/27/2021. It is thus clear that the parties agree that the Solo and the Ciro meet the elements of the patents as alleged except as to these three areas of disagreement.

base). When pressed together, the trapezoidal features prevent the cartridge and power unit from rotating. *See* Doc. 122-1 at 19; Doc. 122-8 at ¶ 39. The trapezoidal features are not electrically conductive.

B. VUSE Ciro

Like the Solo, the Ciro is an electronic cigarette that consists of a power unit and a cartridge. The Ciro's cartridge contains a straight, hollowed-out tube with various mechanical pieces inside of it, which, when activated, create an inhalable nicotine mixture. The process begins when air enters through the sides on one end of the cartridge. *See* Doc. 122-8 at ¶¶ 90, 94. The air then enters a single opening at the base of a "positive pin," which is a small, mechanical piece located inside the tube. *See id*. at ¶ 89 (showing the air flow path of the Ciro); Doc. 122-2 at 30 (same). The air hits the opposite end of the positive pin, exits through two perpendicular holes, and flows through a "silicone base" before converging again on a "heating element." *See* Doc. 122-8 at ¶¶ 87–95. The air heats and mixes with a "vaporized nicotine solution" and then travels the remaining length of the tube to a mouthpiece where the user inhales the mixture. *See id*.

III. Law

A. Summary Judgment Standard

Summary judgment should be granted if the movant shows there is no genuine dispute as to any material fact and the movant is entitled to judgment as a matter of law. Fed. R. Civ. P. 56(a). The moving party has the initial burden of demonstrating the absence of any material issue of fact; once the moving party meets its initial burden, the non-moving party must come forward with evidentiary material demonstrating the

existence of a genuine issue of material fact requiring a trial. *Ruffin v. Shaw Indus.*, 149 F.3d 294, 300–01 (4th Cir. 1998) (per curiam) (citing *Celotex Corp. v. Catrett*, 477 U.S. 317, 322 (1986) and *Anderson v. Liberty Lobby, Inc.*, 477 U.S. 242, 248–49 (1986)).

In assessing direct infringement in the context of a summary judgment motion, courts first "construe[] the disputed claim terms and then compare[] the properly construed claims to the accused product." *Metabolite Lab'ys, Inc. v. Lab'y Corp. of Am. Holdings*, 370 F.3d 1354, 1360 (Fed. Cir. 2004).

B. Direct Patent Infringement

"Direct infringement requires proof by preponderant evidence that the defendant uses each element of a claim, either literally or under the doctrine of equivalents." *Cheese Sys., Inc. v. Tetra Pak Cheese and Powder Sys., Inc.*, 725 F.3d 1341, 1348 (Fed. Cir. 2013) (cleaned up); *see also Warner-Lambert Co. v. Teva Pharms. USA, Inc.*, 418 F.3d 1326, 1341 n.15 (Fed. Cir. 2005). "[L]iteral infringement requires that each and every limitation set forth in a claim appear in an accused product." *Frank's Casing Crew & Rental Tools, Inc. v. Weatherford Int'l, Inc.*, 389 F.3d 1370, 1378 (Fed. Cir. 2004). "If even one limitation is missing or not met as claimed, there is no literal infringement." *Mas-Hamilton Grp. v. LaGard, Inc.*, 156 F.3d 1206, 1211 (Fed. Cir. 1998).

By contrast, "[i]nfringement under the doctrine of equivalents requires the patentee to prove that the accused device contains an equivalent for each limitation not literally satisfied." *Wi-Lan, Inc. v. Apple, Inc.*, 811 F.3d 455, 463 (Fed. Cir. 2016). "An element in the accused product is equivalent to a claimed element if the differences

between the two elements are 'insubstantial' to one of ordinary skill in the art." *Id.* Like literal infringement, a determination of equivalence is "applied as an objective inquiry on an element-by-element basis." *Warner-Jenkinson Co. v. Hilton Davis Chem. Co.*, 520 U.S. 17, 40 (1997). "Because the doctrine of equivalents is only relevant in the absence of literal infringement, courts regularly decline to consider infringement under the doctrine of equivalents where literal infringement has been found." *Regents of Univ. of Mich. v. Leica Microsystems, Inc.*, No. 19-CV-07470-LHK, 2020 WL 2084891, at *4 (N.D. Ca. Apr. 30, 2020); *see, e.g.*, *Cheese Sys., Inc.*, 725 F.3d at 1349 ("This court affirms on the ground that the accused products literally infringe this element and so does not reach the alternative ground of infringement under the doctrine of equivalents."); *Hybritech Inc. v. Abbott Lab'ys*, 849 F.2d 1446, 1456 (Fed. Cir. 1988) ("Because of this holding on the question of literal infringement, we need not reach Abbott's arguments concerning infringement pursuant to the doctrine of equivalents.").

Fuma can obtain partial summary judgment as to a particular claim element if it shows that, as to that element, the accused product infringes either literally or under the doctrine of equivalents and that no reasonable fact finder could conclude otherwise. For RJR to obtain summary judgment of noninfringement, it must show that the accused products do not infringe at least one element of the asserted claims as construed and that no reasonable fact finder could conclude otherwise.

IV. Questions Presented

First, is there a disputed question of material fact as to whether the Solo has an "electrically conductive portion" adapted to both mechanically and electrically couple the

housing cartridge to the power unit as required by the ’881 patent? Doc. 120 at 12; Doc. 122 at 29.

Second, is there a disputed question of material fact as to whether the Solo has an “electrically conductive threaded portion” within the meaning of the Court’s claim construction for the ’604 patent? Doc. 122 at 35; Doc. 130 at 15.

Third, is there a disputed question of material fact as to whether the Ciro has a straight airflow passageway within the meaning of the Court’s claim construction for the ’604 and ’881 patents? Doc. 120 at 16; Doc. 122 at 43.

V. Analysis

A. The Coupling Element of the ’881 Patent and the Solo.

As to this claim element, Fuma moved for summary judgment of infringement and RJR moved for summary judgment of noninfringement. Because the undisputed evidence establishes that the Solo has an “electrically conductive portion” adapted to both mechanically and electrically couple, and no reasonable juror could conclude otherwise, Fuma’s motion will be granted as to this claim element and RJR’s motion will be denied.

The ’881 patent claims, in claim 1, “[a]n apparatus comprising: a power, source . . . wherein the power source includes an electrically conductive portion; and a cartridge having a housing that comprises an interior, . . . wherein the first end of the housing includes an electrically conductive portion that is adapted to mechanically and electrically couple to the electrically conductive portion of the power source.” Doc. 76-3 at p. 18 ¶¶ 17:16–21, 34–37. It also claims, in claim 8, “[a] cartridge configured to mechanically and electrically couple to a power source of an electronic vaporizer, the

cartridge comprising . . . a housing [and] . . . the first end of the housing having an electrically conductive portion adapted to mechanically and electrically couple to the electrically conductive portion of the power source." *Id*. at p. 18 ¶¶ 18:19–30. The Court previously constructed the term "electrically conductive portion" to have its ordinary meaning, that is, "[a] portion that is electrically conductive." Doc. 95 at 9.

The dispute here boils down to one question: Just how big is a portion? The parties disagree.

RJR contends that the word "portion," as it is used in claims 1 and 8 of the '881 patent, means a single feature that both electrically and mechanically couples the cartridge housing to the power unit. Doc. 122 at 29–32. Fuma contends that RJR's definition is too narrow, and that the word "portion" refers to "an area of the cartridge housing and/or power source where mechanical and electrical coupling takes place." Doc. 133 at 7.

The patent specification supports the interpretation that "portion" does not refer to a single feature, but an area where such features are located. The preferred embodiment of the asserted patents shows a center post within the cartridge housing that is used in electrical coupling but not mechanical coupling. *See* Doc. 76-3 at 4 ('881 patent at Fig. 2). This center post is used to electrically couple the cartridge housing with the positive terminal in the power source, while another electrical thread is used to both mechanically couple and electrically couple with the negative terminals in the power source. *Id*. at p. 12 ¶¶ 6:47–51. Thus, in the preferred embodiment, electrical and mechanical coupling are not combined in a single feature. Using RJR's narrow definition of "portion" would

exclude a preferred embodiment of the patented invention from falling within the scope of the claims. *See, e.g.*, *Broadcom Corp. v. Emulex Corp.*, 732 F.3d 1325, 1333 (Fed. Cir. 2013) ("An interpretation which excludes a disclosed embodiment from the scope of the claim is rarely, if ever, correct." (cleaned up)).

The Court has previously rejected similar constructions from RJR. During claim construction of the term "electrically conductive portion," RJR asserted that its proposed construction "requires that the 'electrically conductive portion' (the structure through which current flows) both fastens (i.e., mechanically couples) and electrically couples the power source to the cartridge housing." Doc. 82 at 21. The Court rejected this construction as "overly complicated and unnecessary." Doc. 95 at 10. For another construction, RJR asserted that the term "electrically conductive threaded portion" meant that "the threads are electrically conductive." *Id*. at 7–8. The Court rejected this construction as well and held that the term meant "the portion is electrically conductive and has threads" in order to give meaning to every word of the phrase. *Id*. at 8.

Nowhere in the specifications or the asserted claims does the term "portion" refer to a particular feature or some individual part of the connection mechanism. The specification in the '604 patent uses the term "portion" to refer generally to the ends of the cartridge housing: "The cartridge **104** also comprises a first end **122** and a second end **124**, which may be considered a portion of the housing **120** or apart from the housing **120**." Doc. 76-2 at p. 12 ¶¶ 3:44–46. The '881 patent-in-suit is consistent with that usage where the asserted claims recite that "the first end of the housing includes an electrically conductive portion that is adapted to mechanically and electrically

couple . . . ." Doc. 76-3 at p. 18 ¶¶ 17:34–37; *see also id.* at p. 18 ¶¶ 18:26–30 (reading similar). The term "portion" refers to an area within the end of the cartridge housing. It does not refer to a particular feature housed therein.

Here, it is undisputed that the accused products have distinct electrical contacts used only to electrically couple the cartridge housing and power unit. *See* Doc. 122 at 13–14; Doc. 130 at 10–11; Doc. 122-1 at 34–35 (describing a "Terminal Center Contact" and two additional "in-molded electrical terminals"). It is also undisputed that the products have entirely separate and distinct "protrusions and recesses" used only to mechanically couple the cartridge housing and the power unit. *See* Doc. 122-3 at ¶ 34 (Fuma's expert noting that the "snap fit" connector limits axial separation); Doc. 122-8 at ¶¶ 36–37, 39 (RJR's expert explaining the "snap fit" connection). The electrical coupling features and the mechanical coupling features are both housed in the same end of the Solo's cartridge housing, the cartridge base, and that base meets the Court's claim construction of "[a] portion that is electrically conductive." Doc. 95 at 9; *see* Doc. 122-1 at 26 (describing how the "Cartridge Base G1" both "positions the [electrical] terminals" and "connects to the power unit and uses four trapezoidal features to limit rotation after connection").

The Solo literally infringes this element of the '881 patent claim and no reasonable fact finder could conclude otherwise. As to this element, Fuma's motion for summary judgment will be granted and RJR's motion will be denied. Because of the holding as to

literal infringement, the Court need not reach the questions of equivalency[4] or prosecution history estoppel[5] as to this element.

B. The Electrically Conductive Threaded Portion Element of the '604 Patent and the Solo.

As to this claim element, RJR moved for summary judgment of noninfringement, contending that there is no literal infringement, that Fuma is estopped from asserting infringement under the doctrine of equivalents, and that there is no infringement under the doctrine of equivalents. *See* Doc. 122 at 35–42. Fuma did not address this question in its own motion for summary judgment but responded to it after it was raised in RJR's motion. *See generally* Doc. 120 (Fuma's motion brief); *see also* Doc. 130 at 15 (Fuma's response contending that material factual issues remain for the jury to decide). Because disputed factual issues remain, RJR's motion will be denied as to this element of the '604 claim.

In relevant part, claim 1 of the '604 patent claims "[a]n apparatus comprising a power source, wherein the power source includes a battery [and] . . . an electrically conductive threaded portion; and a cartridge having a housing . . . wherein the first end of the housing includes an electrically conductive threaded portion that is adapted to

[4] "Because the doctrine of equivalents is only relevant in the absence of literal infringement, courts regularly decline to consider infringement under the doctrine of equivalents where literal infringement has been found." *Regents of Univ. of Mich.*, 2020 WL 2084891, at *4; *see Cheese Sys., Inc.*, 725 F.3d at 1349.

[5] "Prosecution history estoppel applies as part of an infringement analysis to prevent a patentee from using the doctrine of equivalents to recapture subject matter surrendered from the literal scope of a claim during prosecution." *Amgen, Inc. v. Coherus BioSciences, Inc.*, 931 F.3d 1154, 1159 (Fed. Cir. 2019) (cleaned up).

mechanically and electrically couple to the electrically conductive threaded portion of the power source." Doc. 76-2 at p. 19 ¶¶ 17:16–21, 34–38. Claim 12 of the '604 patent claims an apparatus comprising an "electronic cigarette cartridge, wherein the electronic cigarette cartridge includes a housing . . . wherein the first end of the housing includes an electrically conductive threaded portion that is configured to mechanically and electrically couple to a further electrically conductive threaded portion in operative connection with a power source." *Id.* at p. 19 ¶¶ 18:27–28, 49–53.[6]

The Court previously construed the phrase "electrically conductive threaded portion" to mean an "[e]lectrically conductive portion that is threaded." Doc. 95 at 21. And the cartridge base and the power unit connector are "electrically conductive portions" within the meaning of the patents. *See* discussion *supra*. Nevertheless, RJR contends it is entitled to summary judgment based on noninfringement because the Solo does not contain the required "electrically conductive threaded portion." Doc. 122 at 35.

RJR contends that the trapezoidal features on the Solo are not "threads" within the meaning of the claims because they lack a "constant pitch" and are incapable of mechanical coupling.[7] *Id.* at 35–37. Nothing in the claim language requires threads to

[6] Asserted claims 4, 6, 14, 16, and 18 of the '604 patent do not explicitly contain the phrase "electrically conductive threaded portion," but as they are all dependent claims of independent claims 1 and 12, they "incorporate by reference all the limitations of the claim[s] to which [they] refer[]." *Monsanto Co. v. Syngenta Seeds, Inc.*, 503 F.3d 1352, 1357–58 (Fed. Cir. 2007) (citing 35 U.S.C. § 112).

[7] Fuma's expert asserts that RJR's expert uses the terms "pitch" and "helix angle" interchangeably within his report. Doc. 120-7 at 45 n.2; *see* Doc. 120-1 at 34 ("[M]y description restricts the type of helical ridge to one having a constant pitch (*e.g.*, angle of the helix)."). Fuma's expert advises that "pitch" refers to the "spacing between threads" and is an inaccurate

have a constant pitch. Both parties' experts agree that a thread is defined as "[a] helical ridge formed on a cylindrical core," without specific reference to the thread's pitch. *See* Doc. 120-7 at ¶ 37; Doc. 120-1 at ¶ 48; *see also* Doc. 130 at 15; Doc. 134 at 11. Fuma's expert notes that threads with variable pitches are well known and can be purchased at common retail hardware stores. Doc. 120-7 at ¶ 37. Moreover, Fuma's expert testified that the threads of the Solo do have a constant pitch of 35°, as shown by RJR's own engineering drawings. *See id*.

RJR also contends that the Solo is not "threaded" because the trapezoidal features are not adapted to mechanically couple. RJR says that the trapezoidal features only work to "prevent rotation," Doc. 122 at 19, 37, and its expert echoes that proposition by noting that the trapezoidal features "limit twisting of the cartridge relative to the power unit." Doc. 120-1 at ¶ 45. But Fuma has offered testimony from an expert that disputes RJR's contention and says that a restriction on rotational movement does constitute mechanical coupling within the meaning of the claim requirement. *See, e.g.*, Doc. 120-7 at ¶ 34.

The evidence is disputed and there are genuine issues of material fact as to whether the Solo literally infringes this element of the '604 patent. The same issues arise in connection with infringement under the doctrine of equivalents. RJR is not entitled to summary judgment for noninfringement as to this element.

RJR also moves for summary judgment on the issue of prosecution history estoppel, contending that Fuma is estopped from making an infringement argument under

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way to refer to helix angle. Doc. 120-7 at 45 n.2. The Court uses "pitch" in conformity with the parties' usage.

the doctrine of equivalents as to this element. The Court will deny summary judgment without prejudice. If the jury finds that the Solo literally infringes this element or that it does not infringe at all under any infringement theory, there will be no reason to reach the estoppel issue. That is a legal issue for the Court, *see Bio-Rad Lab'ys, Inc. v. 10X Genomics, Inc.*, 967 F.3d 1353, 1364 (Fed. Cir. 2020), and it can be resolved after trial if necessary. Because of the overlapping evidence about literal infringement and the doctrine of equivalents, this will not unduly complicate the trial.

C. The Airflow Passageway Element of the '604 and '881 Patents and the Ciro.

As to the final disputed claim element, Fuma and RJR both moved for summary judgment of infringement and noninfringement, respectively. Because the Ciro literally infringes this element of the '604 and the '881 patents, and because no reasonable fact finder could conclude otherwise, Fuma's motion for summary judgment as to this claim element will be granted and RJR's motion will be denied.

The Court construed claims 1 and 12 of the '604 patent and claims 1 and 8 of the '881 patent to require an "airflow passageway [that] extends in a straight path through the center of the cartridge from a first opening on the first end to a second opening on the opposite end of the cartridge." Doc. 95 at 22; *see also* Doc. 76-2 at p. 19 ¶¶ 17:26–33, 18:36–41; Doc. 76-3 at p. 18 ¶¶ 17:26–33, 18:31–38. While the physical structure of the Ciro is not in dispute, RJR contends that the presence of certain obstructions within the Ciro's airflow passageway prevent the air from proceeding in a straight line from one end to the other. Doc. 122 at 43–46; Doc. 131 at 36–49.

RJR conflates the airflow's path with the airflow passageway. RJR is correct that the air itself does not flow in a straight path through the Ciro, as it must travel around and through certain obstacles housed within the airflow passageway. *See, e.g.*, Doc. 122-8 at ¶ 94 (showing an image of the airflow within the Ciro). These obstacles include a "positive pin," a "silicone base," and a "heating element," *see id.* at ¶¶ 87–88, 94, which both alter the air's path as it travels from the base of the airflow passageway to the opposite end. But the Court's construction order dealt only with the structure of the airflow passageway—not with the airflow's path within that interior passageway.

Indeed, the asserted claims within the '604 patent clearly differentiate the "airflow passageway" from the "airflow." *See, e.g.*, Doc. 76-2 at p. 19 ¶¶ 17:31–32 (stating in Claim 1, "the airflow passageway is configured to allow [] airflow through the cartridge"), ¶ 17:50 (referring in Claim 1, to "the airflow")), ¶¶ 18:3–4 (referring in Claim 4, to "airflow through the passageway"), ¶¶ 18:39–41 ("airflow passageway enables airflow from the first end to the second end"). The distinction between the "airflow" and the "airflow passageway" is important because the airflow may travel around or through obstacles—such as the heating element of the preferred embodiment—while the airflow passageway containing those obstacles extends in a straight path.

RJR contends that the "positive pin," "silicone base," and "heating element" are not merely obstacles within the airflow passageway, but that they are themselves part of the passageway and therefore prevent the passageway from extending in a straight path. Doc. 122 at 43–46; Doc. 131 at 41–49. RJR's contention contradicts the preferred embodiment of the patent-in-suit and the asserted claims, which includes a heating

element positioned in the airflow passageway that causes the airflow path to pass on transverse sides of it. Doc. 76-2 at p. 19 ¶¶ 18:1–4 (stating in Claim 4, "the heating element extends transversely across the airflow passageway, whereby airflow through the passageway passes on both transverse sides of the element"); *see also* Doc. 76-3 at p. 18 ¶¶ 17:44–45, 18:41–44 (stating in Claims 1 and 8 of the '881 patent, ". . . the airflow through the passageway passing on both transverse sides of the heating element"). The "airflow passageway" described in the '604 claims and described in the patents remains straight even when the "airflow" goes around an obstacle placed in the airflow passageway, such as the heating element. *See* Doc. 120-7 at ¶¶ 65, 67 (showing a 2D and 3D view of the air flow inside the Ciro).

In addition to a heating element, the Ciro also has a positive pin and a silicone base that similarly obstruct airflow. But these obstructions do not alter the direction of the Ciro's airflow passageway any more than the heating element. Air enters through an opening at the base of the positive pin and travels straight until it hits a closed end on the opposite side. *See* Doc. 120-1 at ¶¶ 88–89; Doc. 120-7 at ¶¶ 64–65. The closed end causes the air to exit the pin through perpendicular holes before resuming a straight path through the silicone base towards the heating element and the second end of the cartridge. Doc. 120-1 at ¶ 88; Doc. 120-7 at ¶¶ 65–66. The positive pin and silicone base obstruct airflow and alter the airflow's path but not the Ciro's interior airflow passageway, which at all times extends straight through the center of the Ciro's cartridge to the second end as required by the claim. *See, e.g.*, 120-8 at 27 (showing images of the airflow passageway with the positive pin removed and in place). Like the heating element, the positive pin

and silicone base work just like the type of obstacles contemplated by and incorporated in the preferred embodiment of the patent.

RJR makes the separate argument that the Ciro does not meet the Court's claim construction because the airflow passageway does not extend "from a first opening on one end of the cartridge." Doc. 131 at 36–40. RJR contends that air enters through openings on the sides of the Ciro cartridge, not through a single opening at the end, and therefore does not meet the claim language. *Id*. at 37–39; *see* Doc. 122-2 at 30 (showing image of the Ciro's airflow path). Here, RJR conflates airflow entering the Ciro with airflow entering the airflow passageway of the interior of the cartridge housing. The claims at issue do not restrict how air reaches the first opening of the airflow passageway or what happens to the air after it leaves the second opening. The side openings referred to by RJR do not allow air into the airflow passageway until the air converges and passes through a single opening at the base of the positive pin. Doc. 120-7 at ¶¶ 62–63. The flow of air before reaching the accused first opening is extraneous to the asserted claims. *See CIAS, Inc. v. Alliance Gaming Corp.*, 504 F.3d 1356, 1360–61 (Fed. Cir. 2007) (infringing device may include extraneous elements not recited in the claims).

The Ciro's heating element, positive pin, and silicone base are obstacles and do not change the fact that the claimed airflow passageway is present and literally infringes the "airflow passageway" element of the construed claims. Additionally, the side openings on the Ciro are extraneous elements that do not preclude a finding that the airflow passageway extends from "a first opening on the first end to a second opening on the opposite end of the cartridge." There is no genuine issue of material fact as to the

structure of the airflow passageway. The Ciro literally infringes this element of the '604 and the '881 patents and no reasonable fact finder could conclude otherwise. Because the Ciro literally infringes this element, the Court need not address the questions of equivalency or prosecution history estoppel as to this element.

VI. Conclusion

Fuma is entitled to summary judgment as to the Solo's direct infringement of the '881 patent. The Solo has an "electrically conductive portion" adapted to mechanically and electrically couple the housing cartridge to the power unit as required by the Court's construction of the '881 patent. Fuma's motion for summary judgment of direct infringement as to this claim element will be granted and RJR's cross-motion for noninfringement will be denied. The VUSE Solo literally and directly infringes claims 1 and 8 of the '881 patent.

There is a genuine issue of material fact as to whether the Solo has an "electrically conductive threaded portion" within the meaning of the Court's claim construction for the '604 patent. RJR's motion for summary judgment of noninfringement will be denied and this question will be left for trial. The Court will consider the question of prosecution history estoppel for this element post-trial, if necessary.

Fuma is entitled to summary judgment as to the Ciro's direct infringement of the '604 and '881 patents. The Ciro has a straight airflow passageway within the meaning of the Court's claim construction for the '604 and '881 patents. Fuma's motion for summary judgment of direct infringement as to this claim element will be granted and RJR's cross-motion for noninfringement will be denied. This holding resolves all claim

elements related to the Ciro's infringement of the '604 patent and the '881 patent. The VUSE Ciro literally and directly infringes claims 4, 6, 12, 14, and 16 of the '604 patent. The VUSE Ciro also literally and directly infringes claims 1 and 8 of the '881 patent.

For the reasons stated herein, it is **ORDERED** that:

1. Fuma's motion for summary judgment of infringement, Doc. 119, is **GRANTED** as to direct infringement of the '881 patent by the Solo and Ciro and as to direct infringement of the '604 patent by the Ciro.
2. RJR's motion for summary judgment of noninfringement, Doc. 121, is **DENIED**. The denial as to the issue of estoppel is without prejudice to a post-trial motion if necessary.

This the 24th day of May, 2021.

UNITED STATES DISTRICT JUDGE